NOTE XXV.

DESCRIPTIONS OF TWENTY NEW RECENT UNSTALKED CRINOIDS, BELONGING TO THE FAMILIES ANTEDONIDAE AND ATELECRINIDAE, FROM THE DUTCH EAST INDIES

BY

AUSTIN H. CLARK.

The work of the steamship »Siboga" among the islands of the East Indian Archipelago resulted in the discovery of many new species of unstalked crinoids. In view of the large amount of work necessary in assembling and digesting the data accumulated on these, and especially on the species already known, it has seemed advisable to publish in advance preliminary diagnoses of the new forms in order to guard against possible anticipation.

In the present paper the new species belonging to the families ANTEDONIDAE and ATELECRINIDAE, including among them the most striking of those collected by the »Siboga", are considered. All of the new species will be described in greater detail and figured in the final memoir on these animals in the »Siboga" series [1]).

Family ANTEDONIDAE.

Antedon moluccana, sp. nov.

The centrodorsal is low hemispherical, the bare dorsal pole very slightly convex with an obscure broadly rounded median tubercle surrounded by obsolete cirrus-sockets, 1.5 mm. in diameter.

1) See for the explanation of the Nos of the various „Stations" page 156.

The cirri are about XXX, 15—17 (usually the latter), the longest about 18 mm. long; the first segment is very short, the second is one and one half to two times as long as the median diameter, the third is from two and one half to three times as long as the median diameter; the fourth and following are about four times as long as the median diameter; after the eighth the segments slowly become shorter so that the antepenultimate is little if any longer than broad; the penultimate segment is small, wedge-shaped, about half the size of the antepenultimate; the opposing spine is small, subterminal; the longer earlier segments are moderately constricted centrally with expanded and slightly overlapping ends; the shorter terminal segments have straighter dorsal and ventral profiles so that in a lateral view the cirri appear to become broader just at the tip; there may be a slightly marked transition segment at about the eighth.

The radials are even with the edge of the centrodorsal; the IBr_1 are very short, strongly incised in the median line by a rounded posterior process from the axillaries, about half as long in the median line as on the lateral edge and about four times as broad as the maximum (lateral) length; the lateral edges are just in apposition basally, but diverge from each other at an obtuse angle of about 120°; the lateral edges are concave; the axillaries are slightly broader than long, very widely separated, the lateral edges about as long as those of the IBr_1, diverging at approximately a right angle to each other; the anterior sides are approximately at right angles to each other, and are nearly straight; the anterior angle is only very slightly produced; there is a rounded median posterior process incising the IBr_1.

The ten arms resemble those of *Antedon mediterranea*; the first brachial is very short, twice as long exteriorly as interiorly, the median length being about the same as the internal length; the internal proximal third is united with the adjacent first brachial, but the distal two thirds diverge

almost in a straight line; the second brachial is much larger, irregularly quadrate. The arms are all broken, but the size of the animal is about that of an average *A. mediterranea*.

P_1 is 13.5 mm. to 16 mm. long with from eighteen to twenty-one segments, moderately slender, more so than in the other species of the genus, tapering evenly from the base to the delicate tip; the first segment is not quite so long as broad, the second decreases slightly in diameter distally and is about as long as the proximal diameter, the third is between two and one half and three times as long as broad, and the following are somewhat over three times as long as broad, becoming slightly longer distally; the segments have straight sides and no production of the distal edges, but the outer have very slightly swollen articulations; P_a is similar, but not quite so long; P_2 is 7 mm. long with fourteen or fifteen segments, much more slender than P_1, though the proportions of the component segments is similar; P_3 is 5 mm. long with eleven segments, slender and weak; the segments beyond the second being much elongated; P_4 is 5 mm. long with ten segments, slender and weak, similar to the preceding but more slender beyond the third segment; P_5 is 6 mm. long with thirteen segments, slightly stouter than P_4 with slightly shorter segments; P_6 is 7.5 mm. long with fourteen segments, similar to P_5 but with slightly shorter segments which have more expanded ends.

Type locality. — »Siboga" Station N°. 139.

Compsometra iris, sp. nov.

This new species is nearest to *C. serrata*, but the pinnulars have only moderately developed spinous overlapping edges instead of having these excessively developed as in *C. serrata*, the brachials have much less prominent spinous overlapping distal edges, and the cirri are stouter and more curved with shorter distal segments.

The centrodorsal is very low hemispherical, the bare polar area almost covered with pits representing obsolete cirrus sockets.

The cirri are XXX, 10—12, 8 mm. to 9 mm. long, strongly curved; the first segment is very short, the second about twice as long as the median diameter, the third about three times as long as the median diameter, the fourth about the same length as the third; the following gradually decrease so that the antepenultimate is slightly longer than broad and the penultimate about as long as broad; the second and third are strongly constricted centrally with expanded ends, the following gradually losing this character and becoming laterally flattened and hence broader in lateral view, the outer segments being nearly or quite twice the lateral diameter of the proximal; there are no dorsal processes; the opposing spine is large and prominent, triangular, arising from the entire dorsal surface of the penultimate segment and directed obliquely forward.

The radials are even with the edge of the centrodorsal; the IBr_1 are short, almost entirely divided in the median line by a posterior process from the axillary, well separated laterally and not in basal contact; the axillaries are about as broad as long, widely separated laterally, with all the sides concave.

The ten arms, which are 45 mm. long, resemble those of *C. serrata,* but the edges of the brachials, while overlapping and projecting, are much less conspicuously spinous and lack the strong longitudinal ridges running inward from each spinous process.

P_1 is 8.5 mm. long with seventeen or eighteen segments, moderately slender; the first two segments are broader than long, the third is about twice as long as the median diameter, the remainder approximately three times as long as broad, becoming somewhat longer distally; the third and following have slightly projecting and overlapping very finely spinous distal edges, this character gradually increasing in intensity distally; P_2 is 4 mm.

with eleven segments, much smaller and more slender than P_1; the first two segments are short, the third is half again as long as broad, and the following rapidly become elongated; the segments have moderately produced and overlapping spinous distal edges; P_3 is 3 mm. to 4.5 mm. long with about eleven segments, tapering less rapidly than P_2 and stouter, especially distally; P_4 is similar to P_3 but is slightly longer and stouter; the distal pinnules are 7 mm. long, very slender, with sixteen or seventeen segments which have slightly spinous distal ends.

Type locality. — »Siboga" Station N°. 144.

Compsometra parviflora, sp. nov.

The cirri have 8—9 (usually 8) segments and are 4 mm. long; the first segment is about twice as broad as long, the second two to two and one half times as long as the expanded distal end, the third and fourth are the longest, about three times as long as the expanded distal ends; the following slowly decrease in length so that the antepenultimate is about twice as long as the diameter of its expanded end and the penultimate is from one third to one half again as long as broad; the longer proximal segments are constricted centrally with prominent ends, this gradually decreasing in amount as the segments become shorter distally; the opposing spine is terminal, prominent, in length equal to nearly one half the distal diameter of the penultimate segment.

The radials are even with the edge of the centrodorsal, and are slightly separated at their distal angles; the IBr_1 are half as long in the median line as laterally, about three times as broad as the lateral length; the lateral edges converge slightly so that the adjacent IBr_1 are widely separated; the lateral portion of the proximal and distal edges is sometimes slightly thickened; the axillaries are rhombic, the lateral angles truncated, twice as broad as long, widely separated laterally.

The ten arms are from 15 mm. to 18 mm. long; the brachials have somewhat prominent very finely spinous distal ends.

P_1 is 2.3 mm. long with nine or ten segments of which the first is twice as broad as long, the second is somewhat longer than broad, the third two and one half times as long as the proximal diameter, and the following three times as long as the proximal diameter; the third and following are constricted centrally with expanded and overlapping distal ends, which are especially prominent on the distal side of the pinnule where they are armed with long and prominent spines; P_2 is about half as long as P_1 with seven segments which are very long with very strongly everted spinous dorsal distal ends; it bears a gonad on the third-sixth segments; the following pinnules as far as P_5 bear gonads.

Type locality. — »Siboga" Station N°. 50.

Compsometra longicirra, sp. nov.

This species is closest to *C. gracilipes*, but the cirri are longer with more numerous segments, and P_1 is proportionately more slender with more elongated segments which are fewer in number and possess only a slight eversion of the distal ends.

The centrodorsal is low hemispherical, the dorsal portion thickly covered with comparatively large rounded tubercles which become smaller toward the small bare dorsal pole; the cirrus sockets are arranged in a single irregular crowded row.

The cirri are exceedingly slender, X—XV, 14—16, 11 mm. long and straight, with extremely long segments distally; the distal quarter of the cirri tapers to a slender point; there is a long straight terminal claw without an opposing spine; the first segment is very short, the second nearly as long as broad, the third from two and one half to three times as long as the expanded distal end; the following

are nearly or quite four times as long as the distal diameter becoming somewhat longer terminally; the earlier segments are strongly constricted with expanded distal ends, this feature gradually decreasing after the eighth; after the tenth the cirrus gradually tapers to a point.

The radials are even with the edge of the centrodorsal, their distal border sometimes with a few tubercles toward the inner angles; the IBr_1 are twice as long laterally as in the median line, about four times as long as the lateral length; the proximal and distal edges are broadly thickened, the proximal more broadly than the distal, and very finely spinous; the lateral edges are parallel, and are excavated by a rounded notch due to the thickening of the proximal and distal edges; the axillaries are half again as broad as long, rhombic, the lateral angles produced slightly outward and downward in a rounded latero-posterior process; all the edges are slightly everted and very finely spinous.

The ten arms are from 30 mm. to 40 mm. long, exceedingly slender; the brachials are practically smooth with no production of the distal edges.

P_1 is 3.5 mm. long with nine or ten segments of which the first is broader than long, the second slightly longer than broad, the third twice as long as broad, and the following greatly elongated; the third and following have slightly and evenly everted finely spinous distal ends; the pinnule becomes very slender after the first three segments; P_2 is 1.7 mm. long with seven segments, much smaller and weaker than P_1; P_3 is similar to P_2, but is slightly smaller; there is a very slight production of the distal dorsal edges of the component segments of these pinnules; the distal pinnules are from 3.5 mm. to 4 mm. long, and are extremely slender.

Type locality. — »Siboga" Station N°. 167.

Compsometra gracilipes, sp. nov.

The centrodorsal is very low rounded conical, the dorsal

pole bearing a few rounded tubercles, well separated; the cirrus sockets are arranged in two irregularly alternating crowded rows.

The cirri are XVIII—XX, 12—13, 7 mm. to 9 mm. long, extremely slender, the component segments greatly elongated with greatly swollen articulations, especially in the proximal part; distally the cirri taper to a slender sharp tip; the longest proximal segments (third-fifth) are about four times as long as the diameter of their enormously expanded distal ends, which are over twice the diameter of the middle of the segments; beyond the fifth the segments gradually lose the great expansion of the ends; the penultimate segment is about three times as long as the proximal diameter and tapers distally; there is no opposing spine; the terminal claw is about two thirds as long as the penultimate segment and is very slender and very slightly curved.

The division series are essentially as in the preceding species.

The ten arms are from 20 mm. to 23 mm. long; the brachials are elongated and slightly constricted centrally, this increasing distally.

P_1 is 3.5 mm. to 4 mm. long with eleven segments, and tapers evenly from the base to the tip; the first segment is twice as broad as long, the second half again as long as broad, the third twice as long as broad, the following two and one half or three times as long as broad; the third and following segments have produced and overlapping spinous distal ends, this being much more pronounced and coarser along the distal side; P_2 is 1.5 mm. long with seven segments, much smaller and more slender than P_1 but with similar segments of which the second is slightly longer than broad, the third twice as long as broad, and the remainder elongated; P_3 is similar to P_2; the distal pinnules are about 2 mm. long.

Type locality. — »Siboga" Station N°. 50 (reef).

Iridometra (Eumetra) aphrodite, sp. nov.

The centrodorsal is low hemispherical, about 2.9 mm. in basal diameter, almost completely covered with cirrus sockets; the small dorsal pole is papillose as in *I.* (*E.*) *chamberlaini.*

The cirri are XXXV—L, 16—18, 18 mm. long; the first segment is very short, the second about twice as broad as long, the third nearly or quite as long as the proximal diameter, the fourth two or two and one half times as long as the proximal diameter, the fifth-seventh the longest, nearly or quite three times as long as the proximal diameter; the following very gradually decrease in length so that the antepenultimate is from one third to one half again as long as broad; as a whole the cirri are not especially slender; they become moderately compressed in the distal half; the longer earlier segments are slightly constricted centrally, and all the segments have prominent overlapping distal ends; the shorter distal segments have the proximal dorsal angle cut away, so that the distal dorsal angle of the preceding appears prominent; the cirri do not taper distally.

The division series and brachials resemble those of *I.* (*E.*) *chamberlaini*; the distal intersyzygial interval has three oblique muscular articulations.

The ten arms are about 75 mm. long.

P_1 is 5.5 mm. long, evenly tapering from the base to the delicate tip, with eleven or twelve segments of which the first is not quite so long as broad, the second is about as long as broad, the third is half again as long as broad, and the remainder are about twice as long as broad; the pinnule is slightly stiffened; P_2 is 7 mm. long with fifteen segments of which the first is twice as broad as long, the second nearly as long as broad, the third one half again as long as broad, and the remainder about twice as long as broad; the outer segments have slightly prominent distal angles and slightly spinous distal ends;

the pinnule is proportionately stouter than P_1; P_3 is 10 mm. long with nineteen segments, resembling P_2 but tapering slightly less rapidly and with slightly longer outer segments; P_4 is from 4.5 mm. to 5.5 mm. long with from ten to thirteen segments, smaller than P_2 though otherwise similar to it; P_5 is 6.5 mm. long with fourteen segments; the distal pinnules are exceedingly slender, 8 mm. long with seventeen segments.

Type locality. — »Siboga" Station N°. 294.

Iridometra gracilis, sp. nov.

This new species is most closely related to *I. nana*.

The cirri are 7 mm. long with 10 segments of which the third and fourth are the longest, two and one half times as long as the diameter of their greatly expanded distal ends; the antepenultimate segment is one third longer than broad.

The ten arms, which resemble those of *I. nana*, are 35 mm. long.

P_1 is 4.5 mm. long with ten segments, very slender; P_2 is similar, 4.5 mm. long with ten segments; P_3 is 8 mm. long with thirteen segments; P_4 is 3 mm. long with eight segments; P_5 is 4 mm. long with ten segments and bears a gonad; the pinnule segments beyond the second have overlapping and spinous distal edges which are especially prominent on the distal side.

Type locality. — »Siboga" Station N°. 220 (54 meters).

Toxometra purpurea, sp. nov.

The centrodorsal is small, truncated hemispherical, with a small papillose dorsal pole; the cirrus sockets are arranged in three closely crowded alternating marginal rows.

The cirri are XXIV, 13—16, 10 mm. long, recalling those of *Antedon petasus* but smoother dorsally and more slender proximally; the first segment is short, the second

is slightly longer, the third is as long as broad or slightly longer than broad, the fourth is slightly longer, and the fifth and sixth are the longest, twice as long as the proximal diameter; the following gradually become laterally compressed and increase in lateral diameter so that, though they remain actually of the same length, they appear proportionately shorter, the last four before the penultimate being slightly longer than broad; in lateral view the cirri are distally about twice as broad as proximally; there are no dorsal processes; the opposing spine is short, subterminal to submedian, the base involving only a small portion of the dorsal surface of the penultimate segment, directed obliquely forward, in height scarcely equal to one third of the distal diameter of the segment; the terminal claw is somewhat longer than the penultimate segment, stout and strongly curved.

The radials are just visible beyond the edge of the centrodorsal; their distal angles are separated; the IBr_1 are short, about four times as broad as long in the median line, trapezoidal, the lateral edges making an angle of nearly 120° with each other, widely separated interradially; the axillaries are broadly pentagonal, the lateral edges nearly as long as those of the IBr_1 and making with them an angle of about 120°, the anterior sides making with each other an angle of about 90°; the synarthrial tubercles are rather prominent and are slightly produced anteriorly on to the axillaries; the first brachial is short, the inner edge rather less than one half as long as the outer, over twice as broad as the length of the outer edge, interiorly united basally but distally separated in a very broadly obtuse angle; the second brachial is about twice as large as the first, irregularly quadrate; the third and fourth (forming the first syzygial pair) are nearly twice as long interiorly as exteriorly, this inequality in length falling chiefly on the hypozygal, twice as broad as long in the median line; the next four brachials are slightly wedge-shaped, twice as broad as their greater length,

then becoming triangular, about as long as broad and after the proximal fourth of the arm wedge-shaped and about as long as broad, and somewhat longer distally.

P_1 is 5.5 mm. long with fifteen segments, of which the first is very short, the second somewhat longer, the third nearly as long as broad, the fourth slightly longer, and the seventh and following about twice as long as broad; the pinnule is small and slender and tapers evenly from the base to a slender and delicate tip; there is a slight dorsal swelling on the second and third segments; P_2 is 7.5 mm. long with sixteen segments, resembling P_1 but proportionately stouter; the distal edges of the third and following segments are slightly produced and finely spinous; the second and third are slightly thickened dorsally; P_3 is 12 mm. or 13 mm. long with twenty-two segments, resembling P_2 but proportionately stouter; P_4 is from 5 mm. to 5.5 mm. long with fourteen segments, similar in size to P_2, but with very slightly shorter segments distally; P_5 is 6 mm. long with fifteen segments, slightly stouter than P_4 and not tapering so rapidly; the following pinnules are similar to P_5; the distal pinnules are 6.5 mm. long, very slender, with sixteen segments, which are much elongated.

Type locality. — »Siboga" Station N°. 96.

Psathyrometra major, sp. nov.

This species is closely related to *Ps. mira*.

The centrodorsal is conical with the tip rounded off, 5.5 mm. broad at the base and 5 mm. long (measured along the sides); it is divided into five areas by five interradial furrows which are about as broad as the adjacent columns of cirrus-sockets; these furrows are somewhat deeper and more V-shaped than are those of *Ps. mira*; the cirrus-sockets are essentially as in *Ps. mira*, but the median column, instead of consisting of only a single socket, includes two sockets with, in two cases, a more or

less developed third; of the outer columns six have three sockets, two have four and two have two.

Type locality. — »Siboga" Station N°. 45.

Psathyrometra minima, sp. nov.

The centrodorsal is sharply conical, 1.8 mm. in diameter at the base and 1.6 mm. along the sides; somewhat irregular shallow grooves, averaging about half as wide as the cirrus-sockets, divide the sides of the centrodorsal into five radial areas; each radial area contains two columns of cirrus-sockets which are closely crowded together; each column contains usually two sockets (in one case only one).

The arms are all broken at the first syzygy; the distance from the tip of the centrodorsal to the first syzygy is 5.5 mm.

Type locality. — »Siboga" Station N°. 48.

Psathyrometra inusitata, sp. nov.

This species is most closely related to *Ps. congesta* of Hawaii, but it is a much smaller form with a smaller and lower centrodorsal, much shorter segments in the proximal portion of the lower pinnules, and much less developed synarthrial tubercles.

The centrodorsal is small, conical, the sides slightly if at all convex, the bare dorsal pole exceedingly small, 3.2 mm. in basal diameter and 2.4 mm. from the dorsal pole to the interradial border; five very narrow bare areas divide the sides of the centrodorsal into five radial areas; these at the base are rarely half as broad as the adjacent cirrus-sockets, and they are more or less encroached upon by the cirrus-sockets on either side so that their course may be more or less zigzag or irregular; they are scarcely to be made out except in that the outer columns of cirrus-sockets in each radial area are slightly separated from the outer columns in the next area, whereas in each area all

the columns are closely crowded; each radial area has three columns of cirrus-sockets, the two outer of four each, the median of two only; but the sockets are so crowded that the two outer come into apposition just beyond the median; the columnar arrangement is not so distinct as in *Ps. congesta*; at the dorsal pole there are a number of pits representing obsolete cirrus-sockets; some of these are situated directly in the interradial furrows, and their arrangement appears to be in alternating rows instead of in columns, suggesting the origin of the ZENOMETRINAE from *Trichometra*-like forms.

No basal rays are visible; the radials are even with the edge of the centrodorsal in the median line but extend slightly anteriorly in the angles of the calyx where their tips are slightly separated; the IBr_1 are short, proximally nearly four times as broad as long in the median line but decreasing in width distally where they are only about three times as broad as long in the median line; they are widely separated from their neighbors; the axillaries are rhombic, half again as broad as long, with the anterior angle produced; the lateral angles extend far beyond the distal lateral angles of the IBr_1 and meet those of their neighbors, forming large water pores; the synarthrial tubercle is but slightly indicated; the first brachial is three times as long exteriorly as interiorly, half again as broad basally as the exterior length; the inner edges are entirely free and make approximately a right angle with each other; the outer sides are in apposition with the outer sides of the adjacent first brachials, the second brachials are irregularly quadrate, in contact interiorly so that a water pore is formed similar to that between the ossicles of the IBr series; the third and fourth brachials (forming the first syzygial pair) are together slightly longer interiorly than exteriorly, and about as broad as the exterior length; the next four brachials are slightly wedge-shaped, twice as broad as the median length, then becoming more obliquely wedge-shaped; as a whole the IBr series and

arm bases are rugged, showing the affinity of this form with the other larger species of the genus.

P_1 is apparently exceedingly slender and delicate, composed of segments which become very greatly elongated distally; the first segment is broader than long, the next five about as long as broad, the seventh slightly longer than broad; P_2 is much stouter than P_1; the first four segments are short, the following rapidly becoming elongated and being exceedingly long distally.

Type locality. — »Siboga" Station N°. 45.

Psathyrometra anomala, sp. nov.

The centrodorsal is low rounded conical, 1.7 mm. in diameter at the base and about 1 mm. in interradial height; the bare dorsal pole is small; the radial areas are delimited by narrow irregular lines; there are twenty large cirrus sockets, four in each radial area, in two closely crowded columns.

P_2 bears a gonad.

Type locality. — »Siboga" Station N°. 211.

Nanometra clymene, sp. nov.

The centrodorsal is long, rounded conical, about 3.5 mm. in basal diameter and about 3 mm. long from the proximal border to the dorsal pole; the dorsal pole is 2 mm. in diameter, slightly concave; the cirrus-sockets are arranged in four or five closely crowded regularly alternating rows or four closely crowded alternating columns in each radial area, though without any indication of interradial divisions.

The cirri are about LXX, 43—47, 25 mm. to 30 mm. long, moderately slender; the first segment is very short, the second about twice as broad as long or somewhat broader, the third nearly as long as broad, the fourth about one third longer than broad, the sixth-eleventh or -twelfth about twice as long as broad; the following gradually

decrease in length so that the last ten or eleven before the penultimate are twice as broad as long; the fourth and following segments have the distal dorsal edge projecting slightly, this on the short terminal segments becoming a prominent median carination with a convex crest occupying the entire dorsal surface of the segment.

The ends of the basal rays are rather prominent as rounded triangular areas in the angles of the calyx; the radials are rather prominent; the median dorsal line, which is about as long as the lateral edge beyond the basal rays, makes but a very slight angle with the horizontal; the IBr_1 are four times as broad as long in the median line, the lateral edges being from one third to one half again as long as the median length; the lateral edges slope strongly inward, continuing in the same direction as the lateral upturned borders of the radials; the middle third of the proximal border is slightly convex; the distal border is deeply incised by a posterior rounded projection from the axillary; the distal halves of the lateral edges bear a prominent tubercular process; the axillaries are about as broad as long, the anterior sides making a right angle with each other, the anterior angle being slightly produced; a strongly rounded posterior process extends backward to about the same distance below the line connecting the lateral angles as the apex of the anterior angle is above it; there is a prominent lateral tubercular process just below the lateral angles; the distal edges, like the lateral portion of the distal edge of the IBr_1, have an exceedingly finely spinous border; the synarthrial tubercles are broadly rounded, but rather prominent.

The ten arms are mm. long; the first brachial is short, three times as long exteriorly as interiorly, slightly longer in the median line than interiorly; the inner edges are in apposition; the outer edges are slightly concave; the distal inner angles have an indication of tubercles resembling those on the distal outer part of the side of the IBr_1; these tubercles on the ossicles of the IBr series

almost completely close what would otherwise be a large rhombic water-pore; the second brachial is much larger than the first, and is in direct dorsal view almost an equilateral triangle; the outer border is slightly concave and the distal edge is very finely spinous; the third and fourth brachials (together forming the first syzygial pair) are slightly longer interiorly than exteriorly, about twice as broad as long in the median line; the sides are slightly concave and the distal edge is very finely spinous; the following brachials rapidly become oblique, and after the second syzygy triangular and as long as broad, with very finely spinous edges, further out on the arm obliquely wedge-shaped; the brachials have projecting and overlapping finely spinous distal edges, and their dorsal surface is marked with fine parallel longitudinal ridges.

P_1 is 12 mm. or 13 mm. long and is composed of twenty segments of which the first is slightly longer than broad, the second about half again as long as broad, the third about twice as long as the proximal length, and the fourth and following about two and one half times as long as broad; this is the longest pinnule on the arm and is smooth, rather stiff, moderately stout, composed of comparatively long segments, recalling in its general structure P_1 in the larger species of *Psathyrometra*; it tapers moderately in its proximal third but more gradually from that point onward; the segments are closely joined, their lines of union being fine and straight as in the stiffened pinnules of the species of *Stephanometra*; P_2 is 10 mm. to 10.5 mm. long with seventeen segments, similar to P_1 but tapering a trifle more evenly; P_3 is 8 mm. long with thirteen or fourteen segments, similar to P_1 and P_2 but proportionately smaller and with slightly more elongated segments distally; P_4 is 5.5 mm. long with twelve or thirteen segments, similar to P_3 but proportionately smaller, with slightly longer distal segments; P_5 is 5.5 mm. long with twelve or thirteen segments resembling the preceding but more slender and with longer

outer segments; P_6 is 7 mm. long with fifteen segments, longer, less slender and less stiff than the preceding; the segments have very slightly spinous distal borders; the following pinnules are similar to P_6; the distal pinnules are exceedingly slender, 11 mm. long with twenty-three segments of which the first two are unusually enlarged and the following are moderately elongated with swollen articulations and finely spinous distal ends.

Type locality. — »Siboga" Station N°. 253.

Trichometra delicata, sp. nov.

Antedon alternata (part.) 1888. P. H. CARPENTER, „Challenger" Report, vol. 26, Zoology, pl. 32, fig. 6.

The centrodorsal is rounded conical, about 1.2 mm. broad at the base and about 0.9 mm. from the dorsal pole to the interradial margin similar to, but very slightly longer than, the centrodorsal in the specimen figured by Carpenter; the centrodorsal is almost entirely covered by forty closely crowded cirrus-sockets; the small bare polar area bears a few long tubercles.

The cirri have 21—22 segments and are of the same character as those of *T. aspera*; the fourth and fifth segments, which are the longest, are twice as long as the expanded distal ends; the last four or five are little if at all longer than broad.

The radials are short in the median line but extend well up in the angles of the calyx, so that the bases of the IBr_1 are not in apposition; the IBr_1 are very short, about five times as broad as long in the median line, slightly longer laterally than in the median line; the outer sides are parallel; the proximal edge is slightly everted; the distal edge, except in the median line, is everted and finely spinous; there is a tuft of spines at the distal outer angles; the axillaries are almost triangular, slightly broader than long, the distal edges slightly everted and very finely spinous, the lateral angles covered with spines; the ossicles

of the IBr series and the lower brachials are in lateral contact except for a narrowly cross-shaped water-pore in the IBr series and small water-pores between the first two brachials; the brachials have only very slightly produced and very finely spinous distal ends.

Type locality. — »Siboga" Station N°. 211.

Trichometra brevipes, sp. nov.

This species is nearest to *T. remota* with which it agrees in general structure and in the short segmented cirri; but it differs from that form in the spinous and everted edges of the ossicles of the IBr series and lower brachials.

The centrodorsal is low conical, twice as broad basally as high, and bears about thirty closely crowded and irregularly placed cirrus-sockets which have very prominent rims.

The cirri are about XXX, 18—20, about 4 mm. long; the first segment is very short, the second about as long as the median diameter, the third-fifth or -sixth the longest, about as long as the diameter of the expanded distal ends; the following gradually decrease in length so that the outer nine or ten are slightly broader than long; the longer earlier segments are constricted centrally with greatly expanded and overlapping distal ends, this feature rapidly disappearing as the segments become shorter.

The radials are concealed; the IBr_1 are extremely short, in close lateral apposition, the lateral edges slightly everted; the axillaries are nearly as broad as long, almost triangular, with a moderate rounded posterior process, just in apposition laterally; the lower brachials are also in apposition; there are no water-pores; there is a faint shallow median groove on the ossicles of the IBr series; the edges of these and of the brachials are prominently everted and spinous; the dorsal surface of the lower brachials is also more or less thickly covered with very fine spines.

Type locality. — »Siboga" Station N°. 150.

Thaumatometra alcyon, sp. nov.

The long cirri of this species which have short distal segments resemble those of the species of *Trichometra*, but the short P_1 and the gonad on P_2 place it in *Thaumatometra*; it appears to be most closely related to *Th. laevis*.

The centrodorsal is rounded conical.

The cirri are L—LX, 27—28, 18 mm. long; the longest segments are about three times as long as their median diameter, or about twice as long as the somewhat expanded distal ends; the last six or seven are slightly longer than broad.

The radials are just visible beyond the edge of the centrodorsal; their distal angles are slightly separated; the IBr_1 are extremely short; the axillaries are broader than long, with all the sides concave; the lateral angles extend well beyond the distal angles of the IBr_1, and there is a prominent posterior process incising the IBr_1; the arms are probably about 60 mm. long; the first brachial is very short, basally not quite in apposition, the interior edges diverging nearly in a straight line; the following brachials resemble those of the other species of the genus; they have slightly overlapping and finely spinous distal ends.

P_1 is 7 mm. to 9 mm. long with from nineteen to twenty-three segments, weak and slender; the first four segments are about as long as broad and the following slowly increase in length so that the outer are twice as long as broad or slightly longer, with somewhat expanded and spinous distal ends, and the terminal are much elongated; P_2 is about 10 mm. long with sixteen segments of which the first two are about as long as broad, the third and fourth twice as long as the median diameter, and the following greatly elongated; it is considerably stouter than P_1 and bears a gonad on the fifth-eighth segments; the distal pinnules are 10 mm. long with about fifteen segments which have much expanded overlapping finely spinous distal ends.

Type locality. — »Siboga" Station N°. 251.

Thaumatometra thysbe, sp. nov.

This new form is nearest to *T. alternata* as represented by the specimens dredged by the »Challenger" at Station N°. 170 A (*cf.* »Challenger" Report, Comatulae, pl. 18, fig. 1); but P_1 is much longer with much more elongated segments distally, the cirri have much more expanded ends to the proximal segments, and the division series are much narrower so that there are large spaces between the IBr series.

The centrodorsal is small, rounded conical.

The cirri are about XL, 15—16, 9 mm. long; the first segment is short, the second is about as long as the expanded distal end, the third is twice as long as the expanded distal end, and the fourth is slightly longer; the following very slowly decrease in length so that the last two before the penultimate are from one third to one half again as long as broad; the earlier segments have the ends greatly expanded, especially the distal end which strongly overlaps the bases of the succeeding segments; as the segments become shorter the dorsal and ventral profiles become straighter and there is a slight lateral compression so that they appear wider in lateral view; there is also a slight prominence of the median portion of the distal dorsal edge.

The radials are just visible beyond the edge of the centrodorsal, but extend well up in the angles of the calyx where they diverge slightly distally so that the bases of the IBr_1 are not quite in apposition; the IBr_1 are very short, almost oblong, about four times as broad as long exteriorly, slightly shorter in the median line than laterally; the lateral edges of adjacent IBr_1 make an angle of about 90° with each other; the distal edges are narrowly everted and very finely spinous; the axillaries are about as broad as long, the distal edges making approximately a right angle with each other; the distal angle is not produced; there is a broad rounded posterior angle incising the IBr_1;

the lateral angles extend considerably beyond the distal angles of the IBr_1; the distal edges are everted and very finely spinous.

The ten arms are 30 mm. long and resemble those of other species of the genus; the distal edges of the brachials are moderately everted and finely spinous.

P_1 is about 6.5 mm. long with more than fifteen segments of which the first two are broader than long, the third is about as long as broad, the fourth is half again as long as broad, and the following become excessively elongated with swollen projecting and overlapping spinous distal ends; P_2 is 4 mm. long with eleven or twelve segments, stouter than P_1 but exceedingly slender distally, the segments beyond the third being excessively elongated; there is a large gonad on the fourth-seventh segments.

Type locality. — »Siboga" Station N° 52.

Family Atelecrinidae.

Atopocrinus, gen. nov.

Genotype. — *Atopocrinus sibogae*, sp. nov.

Diagnosis. — Centrodorsal sharply conical, longer than broad at the base; the surface is divided into five radial areas by five strong interradial ridges, and each radial area is bisected by a similar ridge; the cirrus-sockets are therefore arranged in ten columns.

The lower portion of each cirrus-socket projects outward forming a roof over the cirrus-socket next below; each cirrus-socket bears two lateral ridges which extend somewhat beyond the crests of the interradial and radial ridges so that these appear strongly serrate.

The five basals are extremely reduced so that they appear externally as five narrow lines separating the basal rays from the centrodorsal; the basal rays are large and well developed.

There are five arms, no IBr series being present; the

brachials resemble those of *Atelecrinus* except in being more rugged.

All the pinnules are present, and resemble those of the large species of *Zenometra* or of *Psathyrometra*.

Atopocrinus sibogae, sp. nov.

The centrodorsal is as described in the generic diagnosis; deep subradial clefts separate the centrodorsal from the radials; high and narrow basal rays of which the outer ends are broadly pentagonal and convex cap the ends of the interradial ridges of the centrodorsal though entirely separated from it by very thin lines which represent the edges of the greatly reduced basals; the general aspect of the centrodorsal and the proximal structure is very like that of the large species of *Zenometra* or of *Psathyrometra*.

The cirri are lacking.

The radials are much shorter than those of *Atelecrinus* and much more recumbent.

There are five arms, very stout and probably also very long; the distance from the subradial cleft to the distal border of the tenth brachial is 19 mm.; there are no IBr series; the brachials, though much more rugged, are similar to the brachials of the species of *Atelecrinus* and therefore differ from those of the other comatulid genera in passing at once into the triangular form without the intervention of more or less oblong brachials; the first syzygy normally occurs between the fourth and fifth brachials instead of between the third and fourth, this species agreeing with the species of the PENTAMETROCRINIDAE in this respect as well as in the absence of the IBr series.

The lower pinnules are all present (though all are absent in the species of *Atelecrinus*), and resemble those of the larger species of *Zenometra* or *Psathyrometra*; P_1 is about 16 mm. long; P_2 is 15 mm. long and is composed of ten segments.

The disk resembles that of *Atelecrinus balanoides* and is

comparatively small and compact; the ventral surface takes the form of a high rounded dome reaching to the height of the base of the ninth brachial; from the central (highest) point of this dome the ambulacra, which reach the arms at about the ninth brachial, are supported upon high narrow bridges as in *Gephyrocrinus*, *Thalassocrinus* and *Ptilocrinus*; up to the height of the general surface of the disk the pinnules are connected with it by webs or thin sheets of perisome, resembling the thicker sheets which support the brachial ambulacra in their passage to the arms; a strip of thickened perisome extends interradially to the union of the radials, just above which it bears a cluster of about a dozen small disconnected rounded calcareous plates.

The syzygial faces in this species show five radial ridges only, one in the dorsoventral line and two on either side of it; the ridges are very high so that the ligament fibers are long, appearing in dorsal view almost or quite as long as those of the neighboring dorsal ligaments.

Type locality. — »Siboga" Station N°. 177.

Atelecrinus sulcatus, sp. nov.

This species differs from *A. wyvillei* in its more sharply conical centrodorsal which has a pentagonal base and bears interradial ridges proximally which become marked interradial furrows between the columns of cirrus-sockets, and in the greater height of the lateral ridges bordering the cirrus-sockets.

The centrodorsal is sharply conical, 3 mm. broad at the base and 4 mm. in vertical height; the cirrus-sockets are arranged in ten columns, four, more rarely five, to a column; the columns of each radial area are close together, those of adjacent radial areas being separated by shallow furrows which basally are in width nearly equal to the diameter of the adjacent cirrus-sockets, but become gradually narrower distally; the interradial separation of the cirrus-

sockets is always somewhat greater than the midradial separation; each cirrus-socket is bordered proximally and laterally by a horse-shoe shaped rim which proximally scarcely rises above the general surface of the centrodorsal but on either side stands out as a high ridge so that in lateral view the sides of the centrodorsal appear strongly serrate, the longer side of the teeth being gently convex, roughly parallel with the dorsoventral axis, the shorter slightly concave, at right angles to this axis; these lateral ridges are thickened gradually distally, but terminate rather abruptly just after attaining their maximum height and thickness so that the border of the cirrus-sockets distal to them is even with the general surface of the centrodorsal; the basal outline of the centrodorsal is pentagonal, each side being slightly and evenly concave; five well marked rounded interradial ridges are present which slowly decrease in height and disappear at about the distal border of the first cirrus-socket; these ridges mark the angles of the pentagon when the centrodorsal is viewed basally.

The basals form a very narrow band of almost uniform height between the radials and the centrodorsal; they are slightly higher in the angles of the calyx than elsewhere, their dorsal surface being here raised to form a proximal continuation of the interradial ridges on the centrodorsal.

The radials and the post-radial structures do not differ essentially from those of *A. wyvillei*.

The first pinnule is on the sixteenth brachial.

Type locality. — »Siboga" Station N°. 85.

Atelecrinus anomalus, sp. nov.

The centrodorsal is very long, cylindrical in the basal third, conical in the distal two thirds, rounded at the tip, 1.8 mm. in basal diameter and about 3 mm. long; the cirrus-sockets are confined to the distal conical portion; they are arranged in ten evenly spaced columns, three (rarely two or four) to a column; the surface of the centro-

dorsal is undifferentiated and smooth, there being no raised rims about the cirrus-sockets; each cirrus-socket bears on either side just above the center a half-conical ridge with the apex inward and lying at the central canal.

The cirri are XXX, 19—20, about 13 mm. long; the first two segments are about twice as broad as long, the third is about as broad as long or slightly broader than long, the fourth is twice as long as the diameter of the ends; the fifth is nearly or quite three times as long as the proximal or distal lateral diameter, the sixth is slightly shorter, and the following gradually decrease in length so that the fourteenth and following are only slightly longer than broad; the fourth-seventh are moderately constricted centrally with prominent ends, this feature disappearing in the next two or three and the cirrus coincidently becoming strongly compressed laterally; the opposing spine is terminal, small and blunt; the terminal claw is slightly longer than the penultimate segment, rather stout, evenly tapering and evenly curved.

The basals are very large, broadly seven sided, in lateral contact for a distance equal to about half the greatest (median) length; the proximal edge, adjoining the rounded interradial ridges of the centrodorsal, is slightly concave; the two adjoining proximal edges are of about the same length, but straight; they meet in the midradial line in a broadly obtuse angle; the anterior angle of the basals is broadly obtuse, and is the same as the midradial angle made by the proximal edges of adjacent basals over the proximal edge of the centrodorsal; the lateral edges of the basal ring are parallel so that the basal ring continues the column made by the columnar basal third of the centrodorsal.

The radials are slightly broader than long, in lateral contact throughout their entire length, the interradial angles somewhat produced proximally, slightly rounded dorsally, this greatly increasing distally so that at the distal portion of the interradial area there is a well marked interradial

furrow; the IBr_1 are proximally about as broad as the lateral length but distally slightly broader, not quite twice as broad as the median length; the lateral length is half again as great as the median length due to the incision by a process from the axillary; the lateral edges are straight, diverging somewhat, entirely free; the axillaries are rhombic, the lateral angles slightly truncated and continuing in the same direction as the lateral edges of the IBr_1; the anterior angle and the process incising the IBr_1 are about equally produced, and the proximal and distal sides are slightly concave.

The ten arms are all broken; the first brachial is wedge-shaped, about as broad as the exterior (greater) length which is about twice as great as the interior length; the inner edges are entirely free; the second brachial is larger, irregularly quadrate; the third brachial is nearly twice as long interiorly as exteriorly, and about as broad as the exterior length.

The total length of the animal from the tip of the centrodorsal to the syzygy between the third and fourth brachials (at which point all the arms are broken off) is 9 mm.

Type locality. — »Siboga" Station N°. 177.

Washington, February 1912.

EXPLANATION OF THE N^{os} OF THE VARIOUS »STATIONS".

N°. 45. Lat. 7° 24′ S.; Long. 118° 15′.2 E. — Depth 794 M.
N°. 48. Lat. 8° 4′.7 S.; Long. 118° 44′.3 E. — Depth 2060 M.
N°. 50. Bay of Badjo, West coast of Flores. — Depth up to 40 M.
N°. 52. Lat. 9° 3′.4 S.; Long. 119° 56′.7 E. — Depth 959 M.
N°. 85. Lat. 0° 36′.5 S.; Long. 119° 29′.5 E. — Depth 724 M.
N°. 96. South-east side of Pearl-bank. Sulu-archipelago. — Depth 15 M.
N°. 139. Lat. 0° 11′ S.; Long. 127° 25′ E. — Depth 397 M.
N°. 144. Anchorage north of Salomakiëe (Damar-) island. — Depth 45 M.
N°. 150. Lat. 0° 6′ N.; Long. 129° 7′.2 E. — Depth 1089 M.
N°. 167. Lat. 2° 35′.5 S.; Long. 131° 26′.2 E. — Depth 95 M.
N°. 177. Lat. 2°24′.5 S.; Long. 129°38′.5 E. — Depth 1633 M.
N°. 211. Lat. 5°40′.7 S.; Long. 120°45′.5 E. — Depth 1158 M.
N°. 220. Anchorage off Pasir Pandjang, West coast of Binongka.
N°. 251. Lat. 5° 28′.4 S.; Long. 132° 0′.2 E. — Depth 204 M.
N°. 253. Lat. 5° 48′.2 S.; Long. 132° 13′ E. — Depth 304 M.
N°. 294. Lat. 10° 12′.2 S.; Long. 124° 27′.3 E. — Depth 73 M.